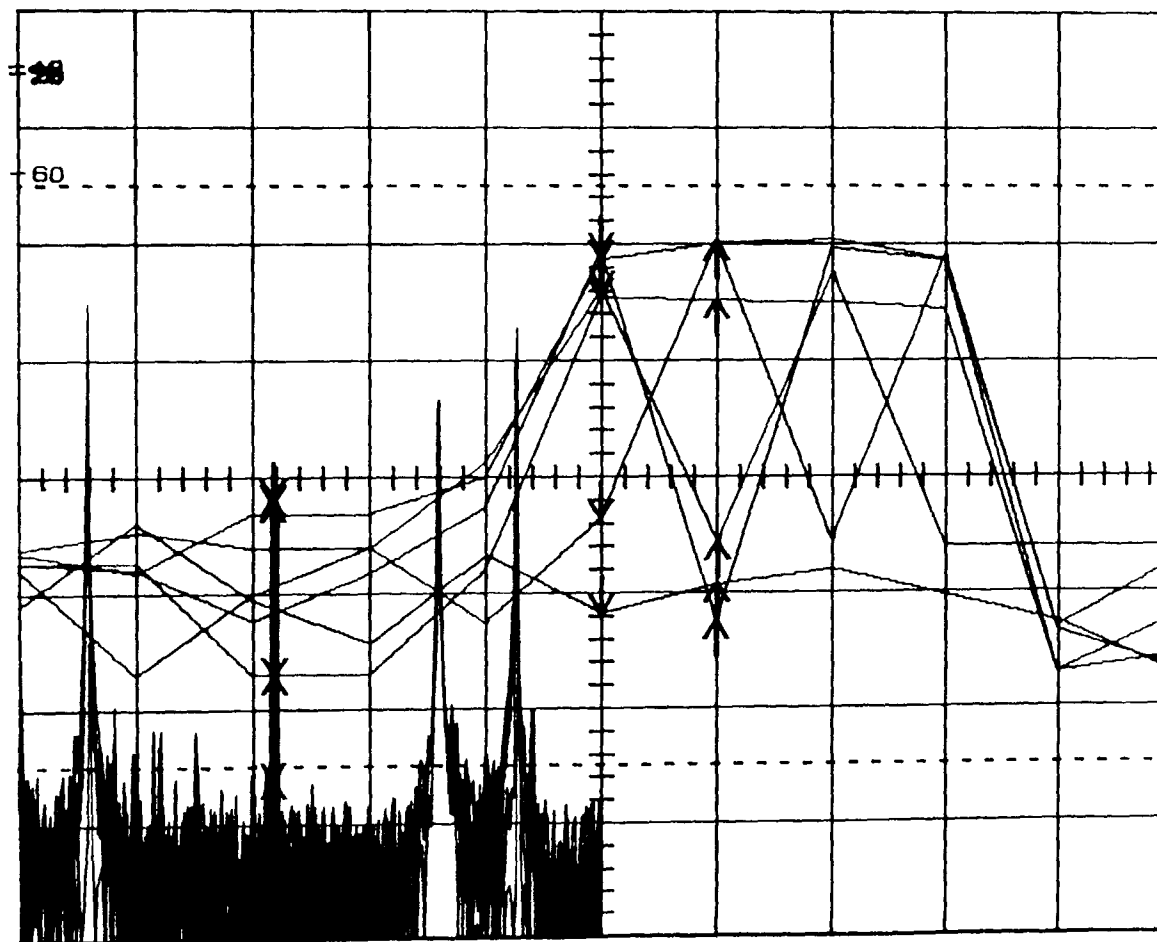


Main
Menu



X-(FFT(1))
225.7888B

FFT(1)
225.7888B

← 175.2 μs ↑

Δf 5.0 kHz

Ch 1> 5 mV =
T/div 20 μs Ch 2 2 V =
Trig .43 V - EXT =

Figure C5

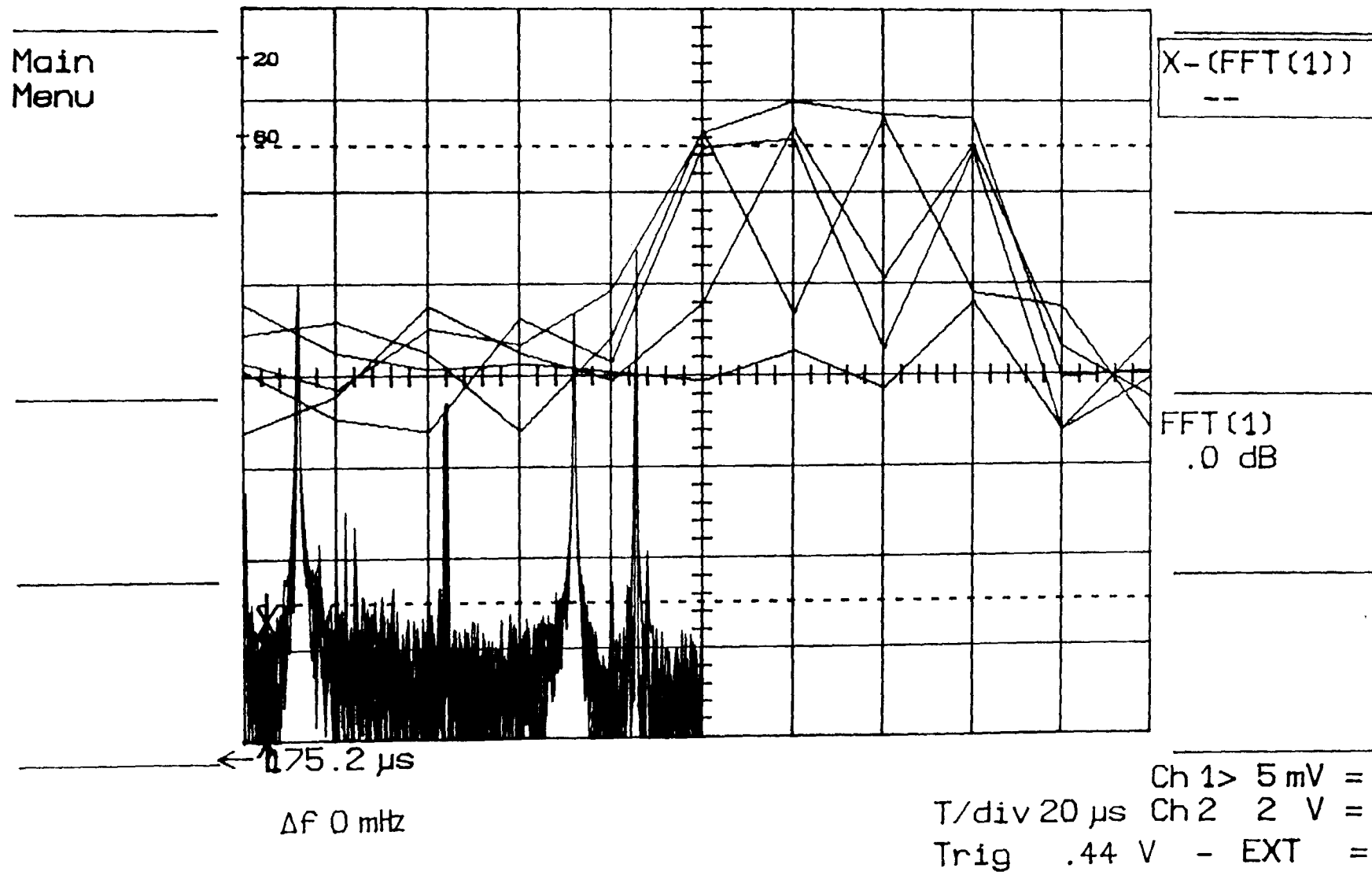


Figure C6

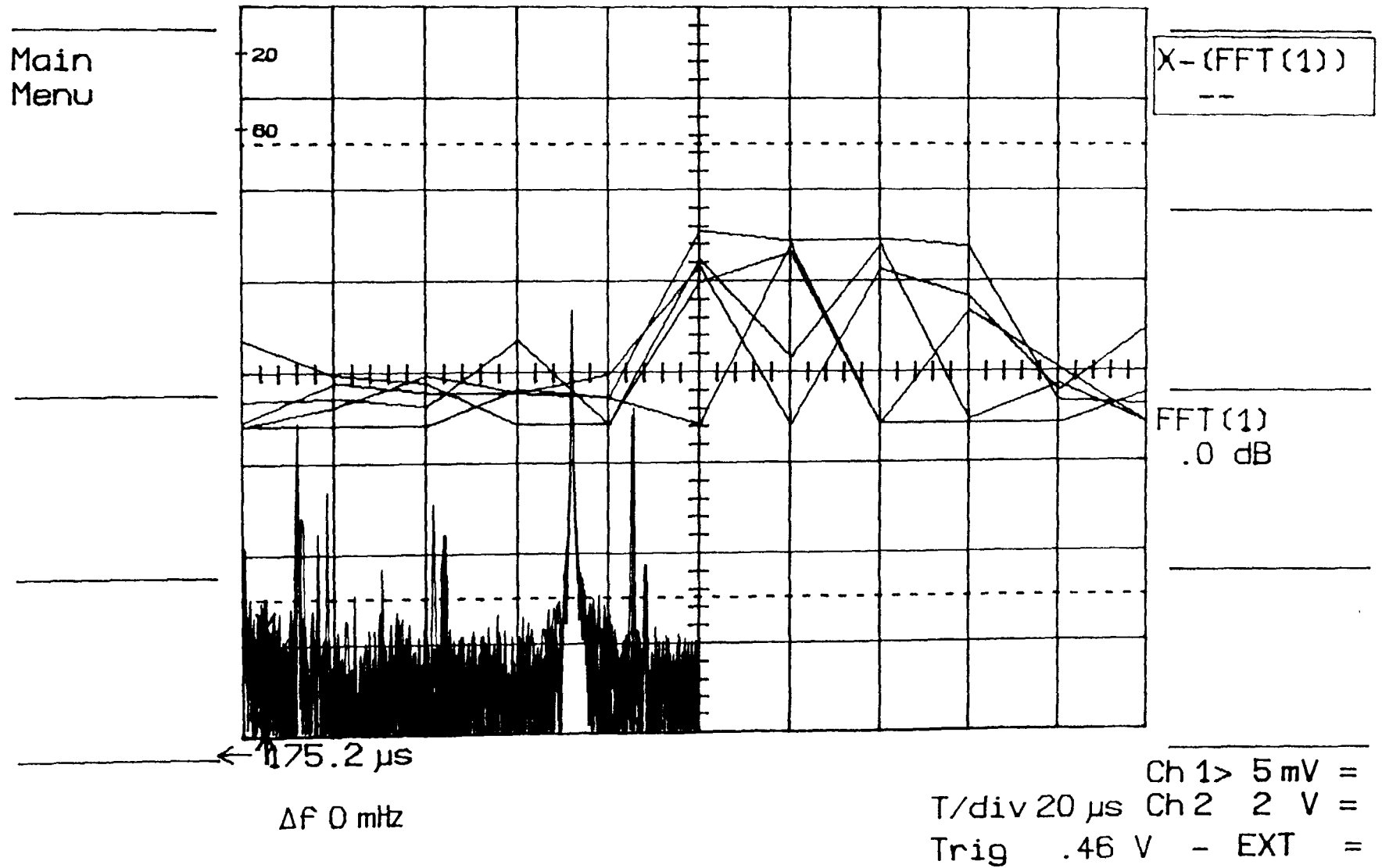


Figure C7

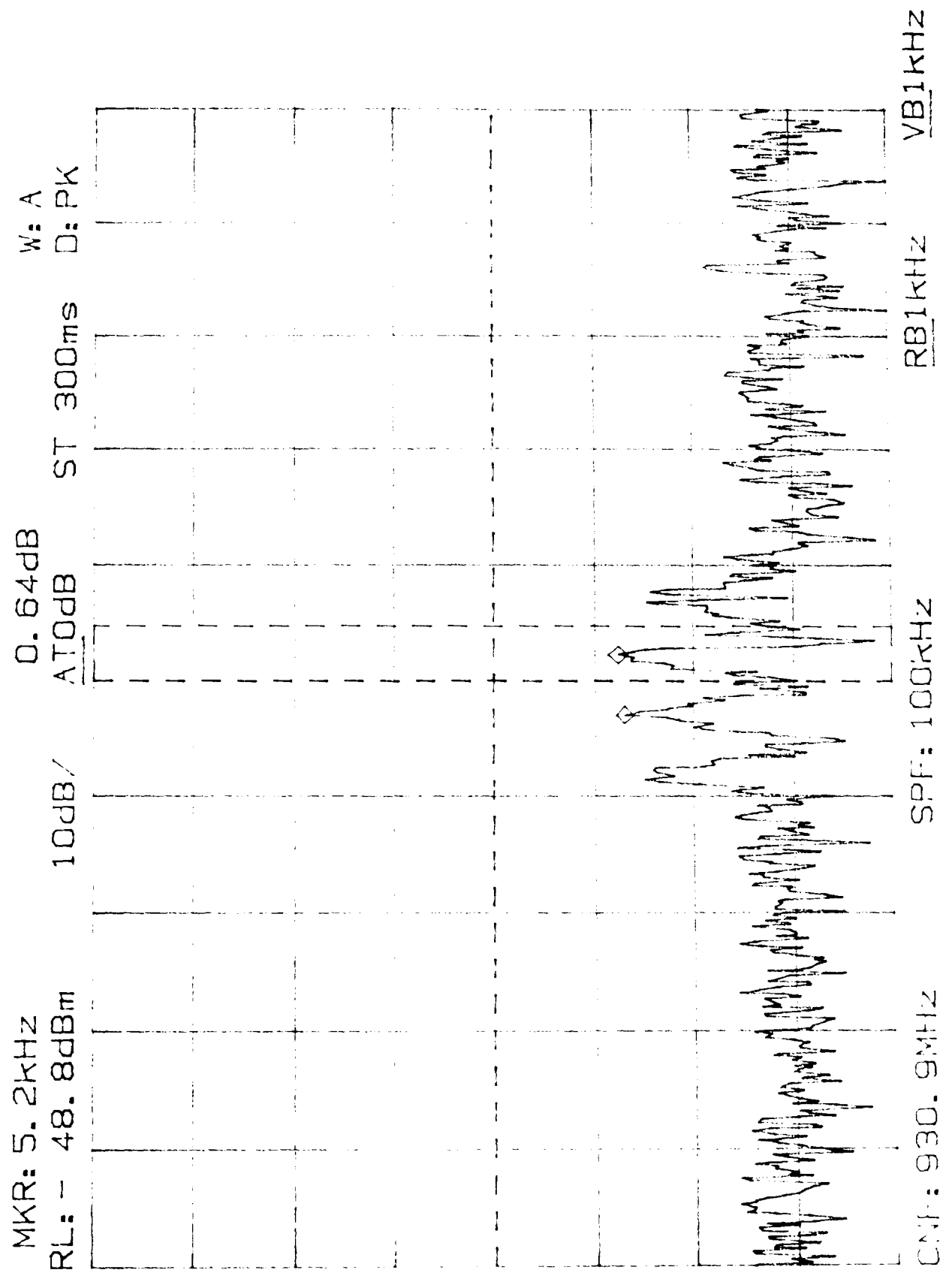


Figure C8

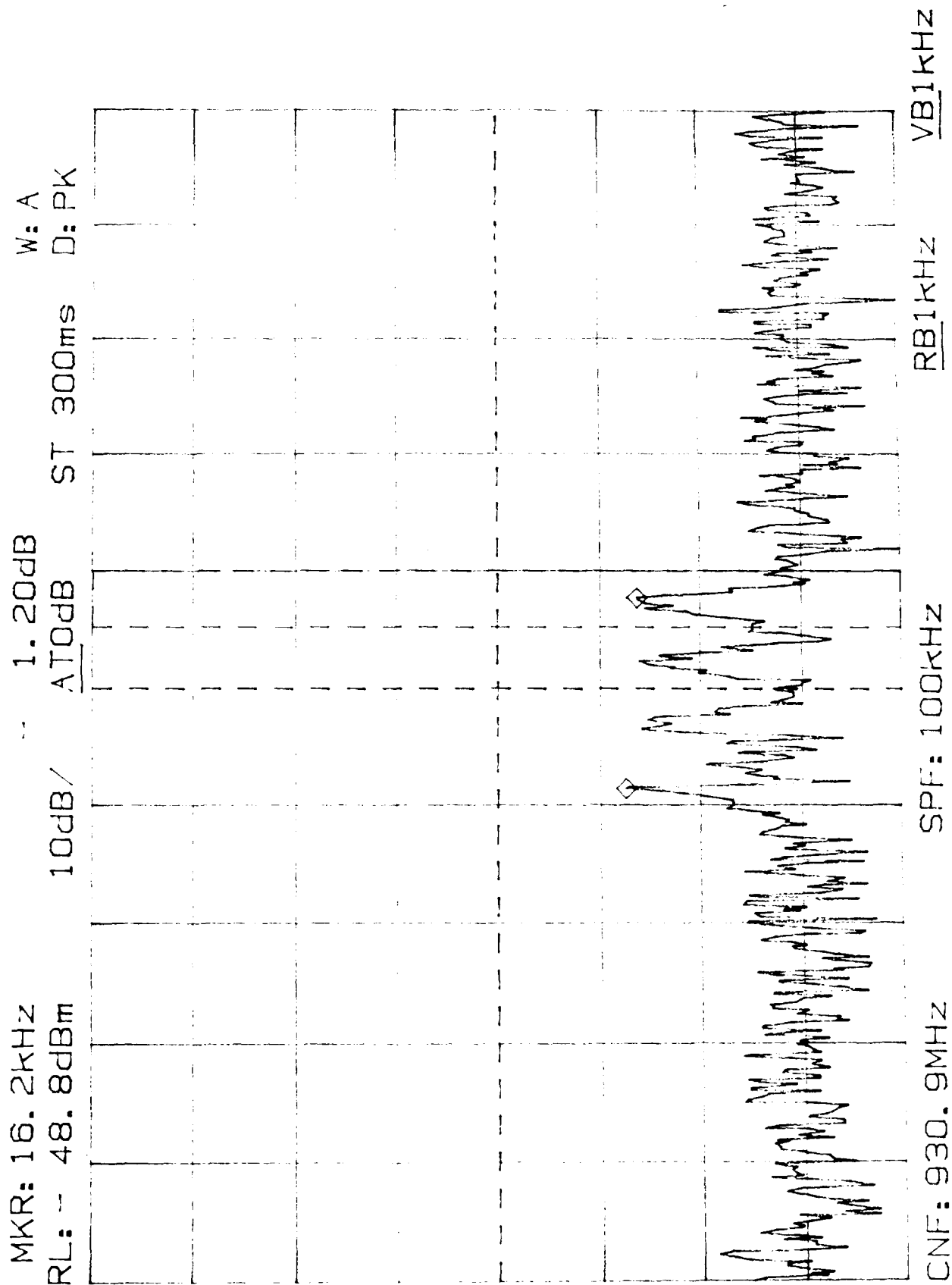


Figure C9

TAB 2

Arthur D Little

**Quantitative
Market Analysis
of Demand for
Nationwide
Wireless Network
Offerings**

**Report to
Mobile
Telecommunication
Technologies**

June 25, 1992

Arthur D. Little, Inc.
1755 Jefferson Davis Highway
Suite 705
Arlington, VA 22202-3516

Reference: 41471

Objectives

This document outlines key findings from a recently completed household survey which was directed at:

1. Assessing the size of the market for the Nationwide Wireless Network-type service offerings over the next five years;
2. Gauging the service requirements that users have in terms of length of messages; and
3. Determining the efficacy of nationwide, regional and local NWN offerings.

In the sections below, we have described the survey methodology, key findings and implications of this work.

Methodology

To gather data to support this analysis, a nationwide survey of adults in eight hundred households was undertaken during June, 1992. The survey was carried out using random digit dialing (RDD) techniques to ensure unbiased coverage of all U.S. households with telephones. The survey sample was stratified on the basis of estimated income per local telephone exchange to provide statistically efficient coverage of higher income households. The data were subsequently weighted to reflect the national income distribution and a statistically representative picture of survey findings.

The survey itself was administered by telephone and involved providing respondents with a description of the Nationwide Wireless Network offering including service features and likely price levels. Respondents were then asked to indicate how likely they would be to subscribe to the NWN service today and in the next five years. A standard five point scale was used for this measurement and asked whether respondents would:

- Definitely subscribe;
- Probably subscribe;
- Might or might not subscribe;
- Probably not subscribe; and
- Definitely not subscribe.

These items were followed by a series of questions regarding the likely use of the service, the length of messages, and the perceived suitability of service coverage on a local, and regional or nationwide basis. Demographic items were also gathered to provide additional information for subsequent analysis.

Findings

Estimated Demand for the NWN Offering

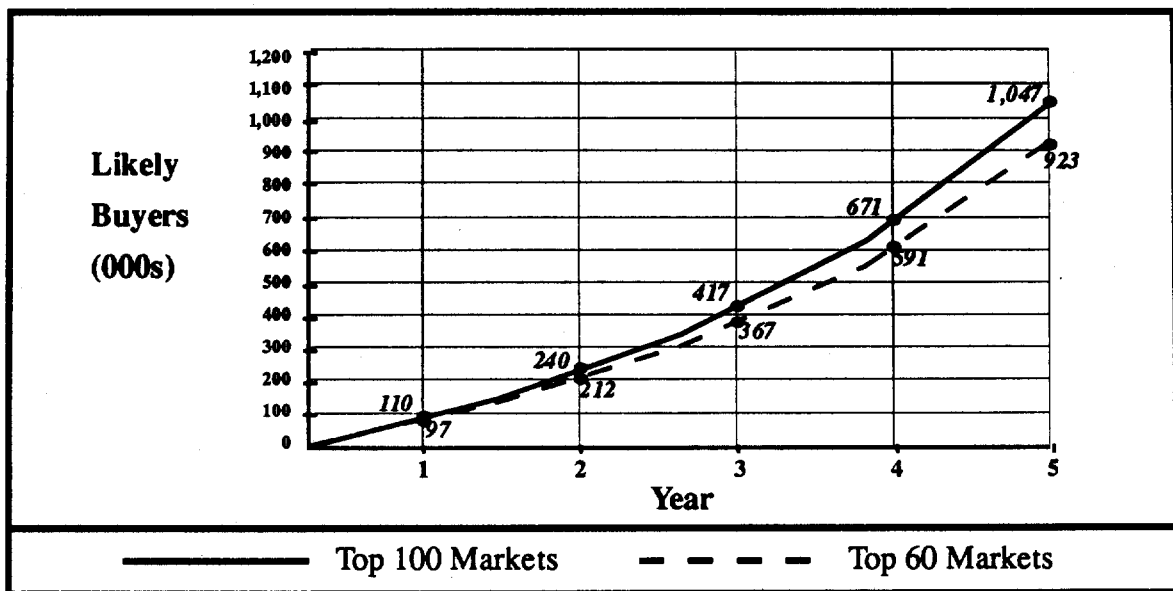
A conservative approach to demand estimation was used in this effort. The assumptions underlying this demand estimate were as follows:

1. It was assumed that only those who indicated that they would "definitely subscribe" would actually acquire the service. In practice, firms typically use less stringent discounting rules for such estimation including eighty percent of those who "definitely subscribe" plus twenty percent of those who "probably subscribe." In this study, we used only one hundred percent of those who said "definitely subscribe";

2. We assumed that only one subscription to NWN would be obtained per household. This understates potential demand since more than one subscription is probable in light of the increasing rate of multiple wage earners in households; and
3. We assumed market coverage of either the top sixty or the top one hundred metropolitan areas during the next five years. To the extent that market coverage would be greater, demand would also be greater.

Demand estimation results are displayed in Figure 1 below and show that the number of likely buyers over a five year period rises to between 923,000 subscribers (top sixty metro areas) and 1.05 million subscribers (top 100 markets). Survey data also show that coverage of all metropolitan areas in the U.S. would yield 1.62 million subscribers by the fifth year of service.

Figure 1:
Estimated Demand for the Nationwide Wireless Network Offering -
Top Sixty and Top One Hundred U.S. Markets

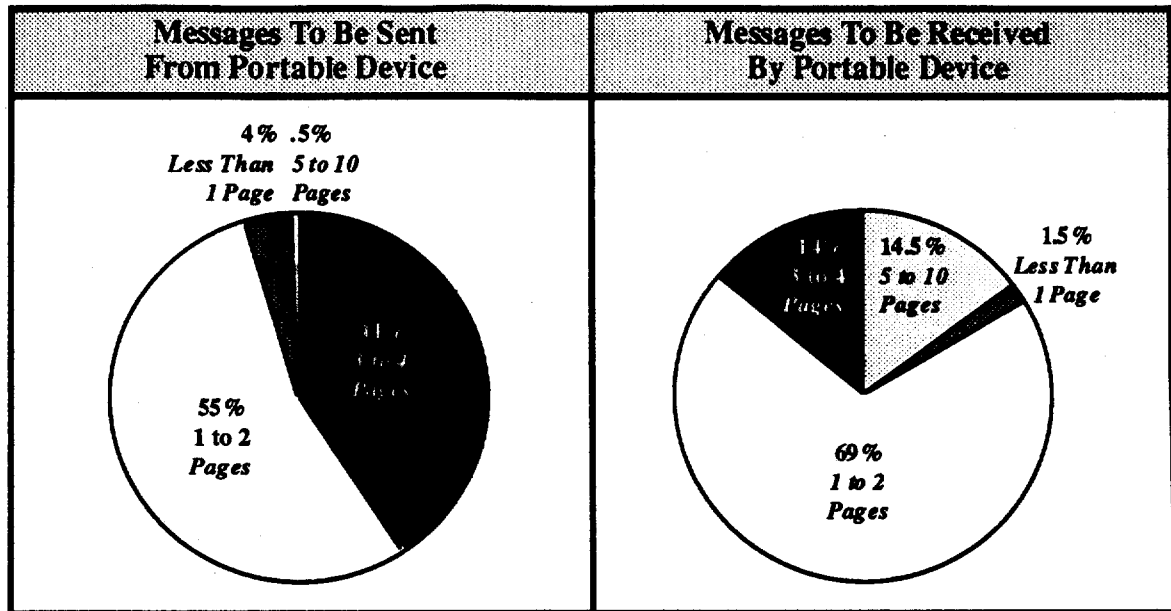


Anticipated Message Length

In an earlier submission, we documented our working hypothesis (derived from focus groups) that users would typically rely on relatively short messages when using the NWN service. To test this hypothesis, we asked likely subscribers to indicate the typical length of messages they would send and receive using the service.

The results of this analysis are shown in the pie charts shown in Figure 2. The findings indicate that 59 percent of likely subscribers (i.e., those who say they will "definitely subscribe") will use the device to send messages of two pages or less. In addition, 41 percent reported that they will send messages of three to four pages and .5 percent indicated that they wish to send messages of five to ten pages. No one reported a requirement for sending messages longer than ten pages.

**Figure 2:
Anticipated Length of Messages Among
Likely NWN Subscribers**



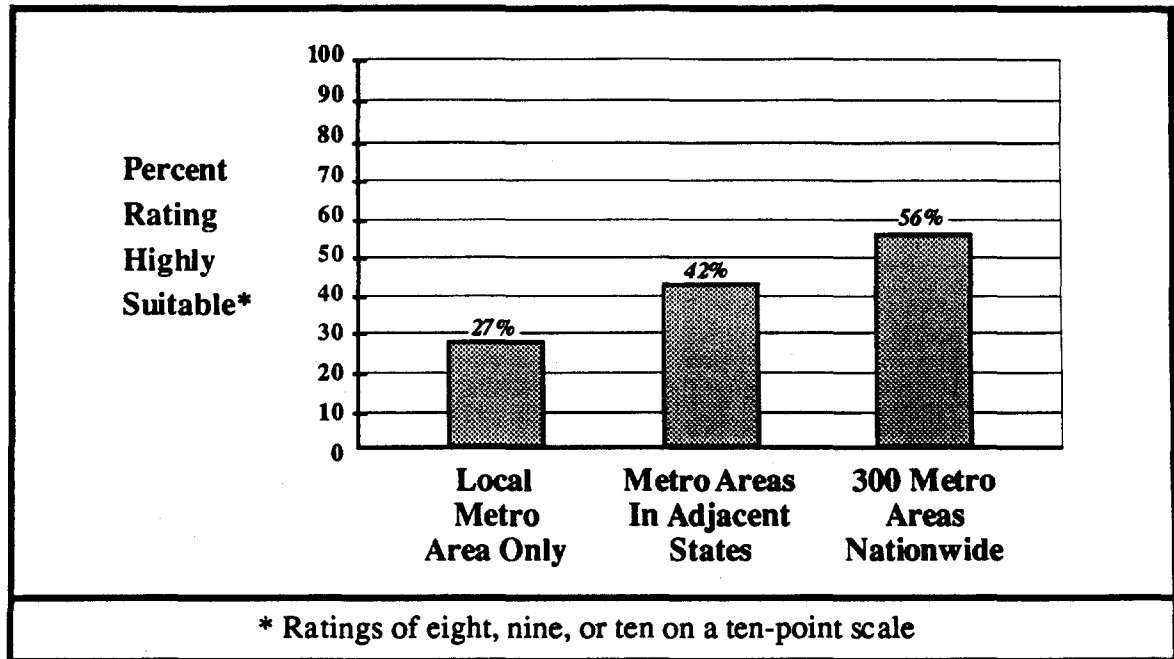
Similar results were obtained when analyzing incoming message requirements. Here the data show that seventy percent of likely subscribers expect to use this device to receive messages of less than two pages in length. In addition, 14 percent wished to receive messages of three to four pages, while 14.5 percent wished to receive messages of five to ten pages.

Perceived Suitability of Local, Regional and Nationwide Coverage

A critical question surrounding NWN is the extent of user requirements for nationwide coverage. To address this issue, the survey asked respondents to rate the suitability of coverage of the NWN offering. A ten point scale was used such that a rating of "1" meant that service coverage was "poorly matched" to their needs while a rating of "10" meant that service coverage was "perfectly matched" to their needs.

The survey results among likely subscribers (i.e., those who indicated that they would definitely subscribe) is shown in Figure 3 below. These data reflect the percentage of those who gave each level of coverage a "high suitability" rating; that is, they rated the coverage eight, nine, or ten. The results indicate that a nationwide service encompassing three hundred markets is perceived to be substantially more suitable than is either local or regional coverage.

Figure 3:
Perceived Suitability of Local, Regional, and Nationwide Messaging Coverage Among Likely NWN Subscribers



Implications

The results from the nationwide survey suggest the following implications:

1. There is substantial demand for NWN-type offerings if provided in either the top sixty or the top one hundred markets. To the extent that complete coverage of all Metropolitan Statistical Areas is possible, potential demand is even greater;
2. Users appear to have relatively modest message length requirements. Typically, these messages will be one or two pages in length; only infrequently will messages of up to ten pages in length be required; and
3. Among likely subscribers to NWN offerings, there is a perception that nationwide coverage is significantly preferred to services which offer only local or regional coverage.